NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech.

SEM: III - THEORY EXAMINATION (2021 - 2022)

Subject: Manufacturing Technology-I

Time: 03:00 Hours   Max. Marks: 100

General Instructions:

1. All questions are compulsory. It comprises of three Sections A, B and C.

• Section A - Question No- 1 is objective type question carrying 1 mark each & Question No- 2 is very short type questions carrying 2 marks each.
• Section B - Question No- 3 is Long answer type - I questions carrying 6 marks each.
• Section C - Question No- 4 to 8 are Long answer type - II questions carrying 10 marks each.
• No sheet should be left blank. Any written material after a Blank sheet will not be evaluated/checked.

<div align="center">SECTION A   20</div>

1. Attempt all parts:-

1-a.   Which of the following is not counted among the limitations of pressure die casting?   1
        (CO1)

        1. Only small parts can be produced

        2. High cost

        3. Low scale production

        4. Castings are porous

1-b.   The function of a gated pattern is _____ (CO1)   1

        1. To produce small castings in mass production

        2. To create castings of a very heavy mass

        3. To create castings containing complex design

        4. To create symmetrical castings

1-c.   _____ is the binder used in the CO2 moulding. (CO2)   1

        1. Silica sand

        2. Sodium Silicate

        3. Sodium Carbonate

        4. Alumina

1-d.   If gas is passed longer than required, the bond becomes _____ (CO2)   1

        1. Impaired

        2. Stronger

        3. Weaker

4. Does not affect much

1-e.	Which of the following metal forming processes performs squeezing out of material through a hole? (CO3)	1

1. Forging

2. Rolling

3. Drawing

4. Extrusion

1-f.	Manufacturing processes which operates under the influence of external forces? (CO3)	1

1. Metal forming

2. Powder metallurgy

3. Casting

4. Welding

1-g.	Which instrument will you use for bending the sheet? (CO4)	1

1. Ball peen hammer

2. Brakes

3. Both (1) and (2)

4. None of these

1-h.	Galvanised iron sheets are coated with _____ (CO4)	1

1. Tin

2. Copper

3. Nickel

4. Zinc

1-i.	Which kind of resistance is experienced in upset butt welding? (CO5)	1

1. Electric resistance

2. Magnetic resistance

3. Thermal resistance

4. Air resistance

1-j.	Electrodes used in spot welding are made up of which material? (CO5)	1

1. Only Copper

2. Copper and tungsten

3. Copper and chromium

4. Copper and aluminium

2. Attempt all parts:-

2-a.	What are the advantages of casting process? (CO1)	2
2-b.	Define pattern. (CO2)	2
2-c.	Explain why parts produced by Forging is preferred when compared to other machining and welding process. (CO3)	2

| 2-d. | Give the difference between punching and blanking. (CO4) | 2 |
| 2-e. | Name the important soldering fluxes (CO5) | 2 |

<div align="center">SECTION B   30</div>

3. Answer any <u>five</u> of the following:-

3-a.	What are pattern allowances? Explain any two pattern allowances with a neat sketch. (CO1)	6
3-b.	Explain the properties of moulding sand. (CO1)	6
3-c.	Briefly describe the shell-molding process. (CO2)	6
3-d.	A cube shaped casting solidifies in 5 min. The solidification time in min for a cube of the same material, which is 8 times heavier than the original casting, will be (CO2)	6
3-e.	Draw a sketch of a die punch assembly. What is the function of the stripper plate.(CO3)	6
3-f.	In a wire drawing operation, initial wire diameter is 5 mm and the final wire diameter is 4.5 mm. Half die angle is 12°. Find the drawing stress considering coefficient of friction μ is 0.2 and K = 18 N/mm². Also calculate the maximum reduction. (CO4)	6
3-g.	Discuss shielded metal arc welding process with a neat sketch. (CO5)	6

<div align="center">SECTION C   50</div>

4. Answer any <u>one</u> of the following:-

| 4-a. | Explain the working principles of investment casting process with a neat sketch? (CO1) | 10 |
| 4-b. | Describe the centrifugal casting process with a neat sketch? (CO1) | 10 |

5. Answer any <u>one</u> of the following:-

| 5-a. | Volume of a cube of side 'l' and volume of a sphere of radius 'r' are equal. Both the cube and the sphere are solid and of same material. They are big cast. The ratio of the solidification time of the cube to the same of the sphere is (CO2) | 10 |
| 5-b. | For sand-casting a steel rectangular plate with dimensions 80 mm × 120 mm × 20 mm, a cylindrical riser has to be designed. The height of the riser is equal to its diameter. The total solidification time for the casting is 2 minutes. In Chvorinov's law for the estimation of the total solidification time, exponent is to be taken as 2. For a solidification time of 3 minutes in the riser, the diameter (in mm) of the riser is _____ (correct to two decimal places). (CO2) | 10 |

6. Answer any <u>one</u> of the following:-

| 6-a. | What is deep drawing? Discuss deep drawing operation. Also explain various defects in deep drawing. (CO3) | 10 |
| 6-b. | Sketch and explain injection moulding process. List the products that can be produced from it. (CO3) | 10 |

7. Answer any <u>one</u> of the following:-

| 7-a. | A copper wire is drawn from an initial diameter 10 mm to 8 mm diameter at a speed of 2 m/sec. If the die angle is 14° and the coefficient of friction is 0.1 between copper wire and die and k = 150 MPa then calculate the drawing power. (CO4) | 10 |
| 7-b. | A mild steel tube of 20 mm outer diameter having 1.5 mm wall thickness is to be | 10 |

drawn to 15 mm outside diameter of 1.2 mm wall thickness. Find out the drawing load if $\mu = 0.15$ and 0.18 for die and plug respectively. Angle of die and plug are 26 and 18° respectively. σ_y = 150 N/mm². Also calculate the power of motor if V = 0.5 m/sec (CO4)

8. Answer any <u>one</u> of the following:-

8-a.   Define MIG welding process with neat sketch what are its advantages and disadvantages. (CO5)   10

8-b.   Define Submerged arc welding process with neat sketch what are its advantages and disadvantages. (CO5)   10